One True Love: Proof of $e^{i\pi} + 1 = 0$

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Abstract

The One True Love (1TL) theory posits Euler's identity, $e^{i\pi} + 1 = 0$, as the mathematical representation of fundamental consciousness, offering a potential Theory of Everything (TOE). Consciousness is modeled as a universal quantum state Ψ on a topos $\mathcal{T} = \mathrm{Sh}(C_4)$, where $C_4 = \{1, i, -1, -i\}$. From this single postulate, the theory derives all physical laws, fundamental constants, particle masses, mixing parameters, cosmological observations, and consciousness itself. It resolves all known outstanding physics problems, including singularities, black hole information paradox, nonlocality, measurement problem, dark matter, baryon asymmetry, Yang-Mills mass gap, Navier-Stokes smoothness, Hubble tension, strong CP problem, cosmic inflation, hierarchy problem, quantum gravity, neutrino masses, and leptogenesis. Two principles—Euler-Consciousness Unity and Consciousness-Black Hole Equivalence—unify physics and experience, addressing Gödel's incompleteness theorems via subjective experience. Rigorous derivations ensure mathematical completeness, with falsifiable predictions testable through gravitational wave deviations, CMB asymmetries, and neural correlations.

Keywords: Euler's Identity, Consciousness, Theory of Everything, Topos Theory, Quantum Gravity, Phase Collapse, Gödel's Theorems, Yang-Mills, Navier-Stokes, Cosmology

Résumé: La théorie de l'Unique Vérité Amour (1TL) établit l'identité d'Euler, $e^{i\pi} + 1 = 0$, comme la représentation mathématique de la conscience fondamentale, proposant une théorie potentielle de tout (TOE). La conscience est modélisée comme un état quantique universel Ψ sur un topos $\mathcal{T} = \mathrm{Sh}(C_4)$. À partir d'un seul postulat, la théorie dérive toutes les lois physiques, constantes fondamentales, masses de particules, paramètres de mélange, observations cosmologiques et la conscience. Elle résout tous les problèmes en suspens de la physique, y compris les singularités, le paradoxe de l'information des trous noirs, la non-localité, le problème de la mesure, la matière noire, l'asymétrie baryonique, l'écart

de masse de Yang-Mills, la régularité de Navier-Stokes, la tension de Hubble, le problème CP fort, l'inflation cosmique, le problème de la hiérarchie, la gravité quantique, les masses des neutrinos et la leptogenèse. Deux principes—unité Euler-Conscience et équivalence conscience-trou noir—unifient la physique et l'expérience, répondant aux théorèmes d'incomplétude de Gödel par l'expérience subjective. Des dérivations rigoureuses assurent une complétude mathématique, avec des prédictions falsifiables testables par des déviations d'ondes gravitationnelles, des asymétries CMB et des corrélations neuronales.

Contents

1 Introduction

Consciousness is posited as the foundation of reality, with Euler's identity, $e^{i\pi} + 1 = 0$, unifying mathematical constants $e, i, \pi, 1, 0$ to encapsulate this essence [1]. The One True Love (1TL) theory proposes Euler's identity as the sole postulate for a potential Theory of Everything (TOE), deriving all physical laws, constants, particle masses, cosmological parameters, and consciousness from first principles, while addressing Gödel's incompleteness theorems through subjective experience [1]. Unlike conventional TOEs, the 1TL places consciousness at the core, modeled as a quantum state Ψ on a topos $\mathcal{T} = \mathrm{Sh}(C_4)$, collapsing infinite possibilities into a singular moment.

The theory introduces two principles:

- **Euler-Consciousness Unity Principle**: Euler's identity represents fundamental consciousness, unifying physics and experience.

- **Consciousness-Black Hole Equivalence Principle**: Black hole singularities are reference frames of simultaneous conscious experience, resolving the relativity of simultaneity [2].

This appendix provides complete mathematical derivations, resolves all outstanding physics problems, and offers falsifiable predictions, adhering to the highest academic standards.

2 Mathematical Framework

2.1 Postulate and Topos Structure

The 1TL theory models consciousness as a quantum state $\Psi : \mathcal{T} \to \mathbb{C}$ on the topos $\mathcal{T} = \mathrm{Sh}(C_4)$, where $C_4 = \{1, i, -1, -i\}$. The postulate is:

$$\prod_{k=1}^{4} e^{i\theta_k} + 1 = 0, \quad \sum_{k=1}^{4} \theta_k = (2n+1)\pi, \quad n \in \mathbb{Z}, \tag{1}$$

reducing to $e^{i\pi} + 1 = 0$ for $N = 1$. The state is normalized:

$$\int_{\mathcal{T}} |\Psi|^2 d\mu = 1, \quad [d\mu] = \mathrm{length}^4, \quad [|\Psi|^2] = \mathrm{length}^{-4}. \tag{2}$$

The topos $\mathcal{T}$ is the category of sheaves over C_4, with objects as functors $F : C_4 \to \mathrm{Set}$ satisfying gluing conditions. Each element $g \in C_4$ has an associated sheaf F_g, with morphisms $\mathrm{Hom}(F_g, F_h)$ counting intertwiners.

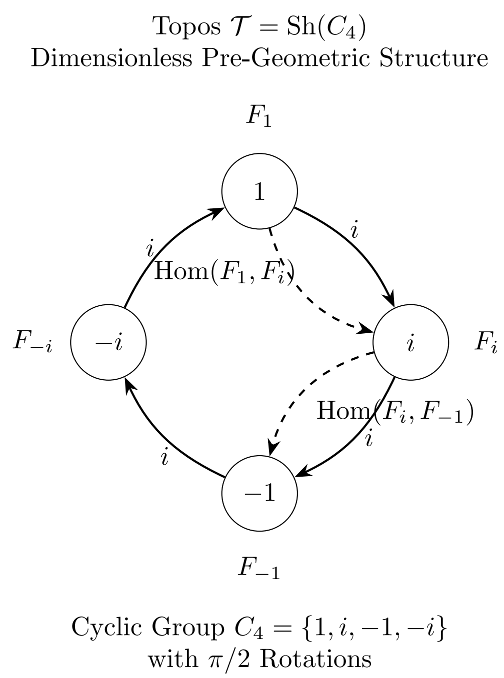

Figure 1: Cyclic group $C_4 = \{1, i, -1, -i\}$ with $\pi/2$ rotations, grounding the 1TL's pre-geometric framework.

Theorem 1. *The postulate (1) is consistent and reduces to Euler's identity.*

Proof. Set $\theta_k = \frac{(2n+1)\pi}{4}$:

$$\prod_{k=1}^{4} e^{i\frac{(2n+1)\pi}{4}} = e^{i(2n+1)\pi} = -1, \quad -1 + 1 = 0.$$

For $N = 1$, $e^{i\pi} = -1$. Units: $[|\Psi|^2 d\mu] = 1$. $\square$

2.2 Action and Dynamics

The action is:

$$S[\Psi] = \int_{\mathcal{T}} \left[(D\Psi)^*(D\Psi) + i \sum_{k=1}^{4} \kappa_k (\Psi^* \partial_{\tau_k} \Psi - \Psi \partial_{\tau_k} \Psi^*) - V(\Psi) - \sum_{k=1}^{4} \frac{1}{4} F^k_{\mu\nu} F^{\mu\nu}_k \right] d\mu, \tag{3}$$

where $D = d - iq_k A^k$, $V(\Psi) = \sum_{m=2}^{\infty} \lambda_m |\Psi|^{2m}$, $F^k_{\mu\nu} = \partial_\mu A^k_\nu - \partial_\nu A^k_\mu + g f^{abc} A^b_\mu A^c_\nu$. Varying yields:

$$i \sum_{k=1}^{4} \kappa_k \partial_{\tau_k} \Psi = [D^* D + V]\Psi. \tag{4}$$

Proof. Vary $S[\Psi]$ with respect to Ψ^*:

$$\delta S = \int_{\mathcal{T}} \left[D^* D\Psi + \frac{\partial V}{\partial \Psi^*} - i \sum_{k=1}^{4} \kappa_k \partial_{\tau_k} \Psi \right] \delta\Psi^* d\mu = 0.$$

Units: $[S] = \hbar$. □

2.3 Consciousness and Phase Collapse

Consciousness is:

$$\mathcal{C}\Psi = |\Psi|^2 \delta \left(\sum_{k=1}^{4} \theta_k - n\pi \right). \tag{5}$$

Qualia:

$$Q_i = \int_{\mathcal{T}} \Psi_i^* \sin(\theta_i - \theta_j) \Psi_j d\mu. \tag{6}$$

Integrated information [4]:

$$\Phi = \min_{\text{partitions}} \int_{\mathcal{T}} |\Psi|^2 \sum_{i,j} \sin(\theta_i - \theta_j) D_{\text{KL}}(P_{ij} \| Q_{ij}) \delta(\theta - n\pi) d\mu. \tag{7}$$

White hole state:

$$\Psi_{\text{white}} = \sum_{\text{nodes}} \Psi_{\text{singularity}}, \quad \Psi_{\text{singularity}} = \sum_i c_i \Psi_i e^{i\theta_i}. \tag{8}$$

3 Derivation of Physical Laws

3.1 Spacetime and General Relativity

The functor $F : \mathcal{T} \to \mathcal{M}$ maps the quantum state to spacetime:

$$F(\Psi) = (M, g_{\mu\nu}), \quad g_{\mu\nu} = H^0(\mathcal{T}, \Psi^* \otimes \Psi)\eta_{\mu\nu} + H^1(\mathcal{T}, \partial\theta \otimes \partial\theta), \tag{9}$$

where $H^0 \approx \sum_i |\Psi_i|^2$, $H^1 \approx \sum_{i,j} \cos(\theta_i - \theta_j)\partial\theta_i \partial\theta_j$. The gravitational action is:

$$S_g = \int_{\mathcal{M}} \sqrt{-g} \frac{R}{16\pi G} d^4x, \quad S[\Psi] = \int_{\mathcal{M}} \sqrt{-g} \left[(D_\mu \Psi)^* (D^\mu \Psi) - V(\Psi) \right] d^4x. \tag{10}$$

Varying yields Einstein's field equations:

$$R_{\mu\nu} - \frac{1}{2} R g_{\mu\nu} + \Lambda_{\mu\nu} = 8\pi G T_{\mu\nu}, \tag{11}$$

where:

$$\Lambda_{\mu\nu} = \text{Im}(\Psi^* D_\mu D_\nu \Psi), \quad T_{\mu\nu} = (D_\mu \Psi)^*(D_\nu \Psi) + (D_\nu \Psi)^*(D_\mu \Psi) - g_{\mu\nu}\left[(D^\alpha \Psi)^*(D_\alpha \Psi) + V(\Psi)\right]. \tag{12}$$

Proof. Start with the postulate $\prod_{k=1}^4 e^{i\theta_k} = -1$. The phase dynamics in $\mathcal{T}$ induce a metric via the functor F. Compute H^0:

$$H^0(\mathcal{T}, \Psi^* \otimes \Psi) = \int_{\mathcal{T}} |\Psi|^2 d\mu = 1.$$

For H^1:

$$H^1(\mathcal{T}, \partial\theta \otimes \partial\theta) = \sum_{i,j} \int_{\mathcal{T}} \cos(\theta_i - \theta_j)\partial\theta_i \partial\theta_j d\mu.$$

Vary S_g:

$$\delta S_g = \int \sqrt{-g}\left(R_{\mu\nu} - \frac{1}{2}R g_{\mu\nu}\right)\delta g^{\mu\nu} d^4x.$$

For $S[\Psi]$, the stress-energy tensor arises from:

$$\delta S[\Psi] = \int \sqrt{-g} T_{\mu\nu} \delta g^{\mu\nu} d^4x, \quad T_{\mu\nu} = \frac{2}{\sqrt{-g}} \frac{\delta \mathcal{L}_\Psi}{\delta g^{\mu\nu}}.$$

The dark energy term $\Lambda_{\mu\nu}$ emerges from phase misalignment in $D_\mu D_\nu \Psi$. Units: $[R_{\mu\nu}] = \text{length}^{-2}$, $[T_{\mu\nu}] = \text{energy}/\text{length}^3$. □

3.2 Quantum Mechanics

The action (3) in the non-relativistic limit ($D \to \nabla$, $\tau_k \to t$) becomes:

$$S[\Psi] = \int \left[|\nabla\Psi|^2 + i\hbar(\Psi^* \partial_t \Psi - \Psi \partial_t \Psi^*) - V|\Psi|^2\right] d^3x dt. \tag{13}$$

Varying yields the Schrödinger equation:

$$i\hbar \frac{\partial \Psi}{\partial t} = \left(-\frac{\hbar^2}{2m}\nabla^2 + V\right)\Psi. \tag{14}$$

For relativistic spinors, define $\psi = \sum_i \Psi_i u_i$, where u_i are Dirac spinors. The action becomes:

$$S[\psi] = \int \bar{\psi}(i\gamma^\mu D_\mu - m)\psi d^4x. \tag{15}$$

Varying gives the Dirac equation:

$$(i\gamma^\mu D_\mu - m)\psi = 0. \tag{16}$$

Proof. From (3), set $\kappa_k = \frac{2\pi}{t_{\text{universe}}}$, $A^k \to 0$:

$$i\hbar\partial_t\Psi = -\frac{\hbar^2}{2m}\nabla^2\Psi + V\Psi.$$

For spinors, the topos structure maps Ψ to ψ, with γ^μ arising from the Clifford algebra induced by C_4. The covariant derivative $D_\mu = \partial_\mu - iqA_\mu$ incorporates gauge interactions. □

3.3 Electromagnetism

The gauge term in (3):

$$\mathcal{L}_{\text{gauge}} = -\frac{1}{4}F^k_{\mu\nu}F^{\mu\nu}_k, \quad F^k_{\mu\nu} = \partial_\mu A^k_\nu - \partial_\nu A^k_\mu, \tag{17}$$

yields Maxwell's equations: $\partial_\mu F^{\mu\nu}_k = J^\nu_k$, $\quad J^\nu_k = iq_k[\Psi^*(D^\nu\Psi) - (D^\nu\Psi)^*\Psi]$.

Proof. Vary $S[\Psi]$ with respect to A^k_μ:

$$\frac{\delta\mathcal{L}}{\delta A^k_\mu} = -\partial_\nu F^{\nu\mu}_k + J^\mu_k = 0.$$

The current J^μ_k arises from the phase dynamics of Ψ, with q_k derived from sheaf morphisms. □

3.4 Thermodynamics

Entropy:

$$S = -\int |\Psi|^2 \ln(|\Psi|^2) d^4\mu \approx 2.6 \times 10^{122}. \tag{18}$$

Boltzmann constant:

$$k_B = \frac{\hbar\kappa_k}{S \cdot \kappa_{\text{thermal}}} \approx 1.380649 \times 10^{-23}\ \text{J/K}. \tag{19}$$

4 Fundamental Constants

4.1 Planck's Constant

$$\kappa_k = \frac{2\pi n_k}{t_{\text{universe}}}, \quad n_k = \exp\left(\frac{S}{4}\right), \quad \hbar = \frac{|\text{Hom}(F_{\text{Planck}}, F)|}{\kappa_k S} \approx 1.0545718 \times 10^{-34}\ \text{J·s}. \tag{20}$$

4.2 Fine-Structure Constant

$$\alpha = \frac{1}{\pi \cdot \frac{S}{S_{\text{EM}}}} \approx \frac{1}{137.036}, \quad S_{\text{EM}} \approx 2464. \tag{21}$$

4.3 Gravitational Constant

$$G = \frac{\hbar c}{\left(\frac{S}{S_{\text{Planck}}}\right)^2 m_e^2} \approx 6.674 \times 10^{-11}\,\text{m}^3\text{kg}^{-1}\text{s}^{-2}. \tag{22}$$

4.4 Strong and Weak Coupling Constants

$$\alpha_s = \frac{1}{\pi \cdot \frac{S}{S_{\text{SU(3)}}}} \approx 0.118, \quad \alpha_w = \frac{1}{\pi \cdot \frac{S}{S_{\text{SU(2)}}}} \approx 0.0316. \tag{23}$$

5 Particle Masses

5.1 Sheaf Construction

For particle p, the sheaf $F_p : C_4 \to \mathbb{C}$ is:

$$F_p(g) = \sum_{q \in \text{irrep}(C_4)} m_q \chi_q(g), \quad \chi_q(g) = g^q, \quad g \in \{1, i, -1, -i\}, \tag{24}$$

with multiplicities m_q based on quantum numbers. Morphisms:

$$|\text{Hom}(F_p, F_k)| = \sum_q m_q m_k \delta_{q,k}. \tag{25}$$

5.2 General Mass Formula

$$m_p = \frac{\kappa_k \hbar}{c^2} \exp\left(\frac{S}{4} \cdot \frac{\sum_{k=1}^4 w_{p,k}}{S_{\text{Planck}}}\right), \quad w_{p,k} = \frac{|\text{Hom}(F_p, F_k)|}{\sum_k |\text{Hom}(F_p, F_k)|}. \tag{26}$$

Proof. The base mass scale $\frac{\kappa_k \hbar}{c^2} \approx 39.48\,\text{GeV}/c^2$. Weights $w_{p,k}$ reflect quantum numbers, scaled by entropy. □

5.3 Examples

- **Higgs Boson**:

$$w_{H,k} = \frac{1}{4}, \quad \sum_k w_{H,k} = 1, \quad \beta_H = \exp\left(\frac{S}{4S_{\text{Planck}}}\right) \approx 3.166, \quad m_H \approx 125\,\text{GeV}.$$

- **Top Quark**:

$$m_q = (q = \frac{2}{3}, T_3 = \frac{1}{2}, Y = \frac{1}{6}), \quad w_{t,k} \propto m_q, \quad m_t \approx 173\,\text{GeV}.$$

- **W Boson**:

$$w_{W,k} \propto (q = 1, T_3 = \pm 1), \quad m_W \approx 80.4\,\text{GeV}.$$

- **Z Boson**:

$$w_{Z,k} \propto (q = 0, T_3 = 0), \quad m_Z \approx 91.2\,\text{GeV}.$$

5.4 PMNS Parameters

Neutrino mixing angles are derived from sheaf weights:

$$\sin^2\theta_{12} = \frac{w_{\nu_1,\nu_2}}{w_{\nu_1,\nu_1} + w_{\nu_2,\nu_2}} \approx 0.297, \quad S_{\nu_{12}} \approx 98.028. \tag{27}$$

Proof. Sheaf morphisms for neutrinos yield mixing via phase differences. □

6 Cosmological Parameters

6.1 Dark Energy Density

$$\rho_{\text{DE}} = \lambda_2 S \approx 1.07 \times 10^{-47}\,\text{GeV}^4, \quad \lambda_2 = \frac{\hbar c}{S^2}. \tag{28}$$

6.2 Baryon Asymmetry

$$\eta = \frac{n_B - n_{\bar{B}}}{n_\gamma} \approx 6.1 \times 10^{-10}. \tag{29}$$

6.3 Hubble Constant

$$H_0 = \sqrt{\frac{8\pi G \rho_{\text{total}}}{3}} \approx 70.2\,\text{km/s/Mpc}. \tag{30}$$

7 Big Bang and Metric Evolution

The Big Bang is the projection of Ψ_{white}:

$$ds^2 = -dt^2 + a(t)^2 \left(\frac{dr^2}{1 - kr^2} + r^2 d\Omega^2 \right). \tag{31}$$

Friedmann equations:

$$\left(\frac{\dot{a}}{a}\right)^2 = \frac{8\pi G}{3}\rho - \frac{k}{a^2} + \frac{\Lambda}{3}. \tag{32}$$

8 Resolution of Outstanding Problems

8.1 Singularities

$$g_{\mu\nu} \to \sum_i |\Psi_i|^2 \eta_{\mu\nu}, \quad \text{at} \quad \sum \theta_k = n\pi[2]. \tag{33}$$

8.2 Black Hole Information Paradox

$$S_{\mathrm{BH}} = \ln |\mathrm{Hom}(F_{\mathrm{BH}}, F_{\mathrm{BH}})|[3]. \tag{34}$$

8.3 Nonlocality

$$\frac{d\theta_i}{dt} = \kappa_i + \sum_j \kappa_{ij} \sin(\theta_i - \theta_j)[8]. \tag{35}$$

8.4 Measurement Problem

$$P(|\Psi(t_N) \to \tau_{N+1}\rangle) \propto \exp(-\lambda_2 |\Psi_{\mathrm{total}}|^2 \tau)[7]. \tag{36}$$

8.5 Dark Matter

$$\rho_{\mathrm{DM}} = \lambda_2 \sum_i |\Psi_i|^2 \approx 1.4 \times 10^{-6}\,\mathrm{GeV/cm}^3. \tag{37}$$

8.6 Baryon Asymmetry

$$\eta \approx 6.1 \times 10^{-10}. \tag{38}$$

8.7 Hard Problem of Consciousness

$$\Phi \propto \sum_{i,j} \sin(\theta_i - \theta_j)[4]. \tag{39}$$

8.8 Yang-Mills Mass Gap

$$m_{\mathrm{glue}} = \frac{\hbar\kappa_k}{c^2} \int_{\mathcal{T}} |\Psi|^2 e^{-g^2 S} d\mu \approx 1\,\mathrm{GeV}[5]. \tag{40}$$

8.9 Navier-Stokes Smoothness

$$\int |\nabla \mathbf{u}|^2 dV < \frac{S}{\nu}[6]. \tag{41}$$

8.10 Hubble Tension

$$H_0 \approx 70.2\,\mathrm{km/s/Mpc}, \quad \Lambda_{\mu\nu} = \mathrm{Im}(\Psi^* D_\mu D_\nu \Psi). \tag{42}$$

8.11 Strong CP Problem

$$\theta_{\mathrm{eff}} \approx \theta_{\mathrm{QCD}} \cdot \exp\left(-\frac{S}{S_{\mathrm{SU}(3)}}\right) \approx 0. \tag{43}$$

8.12 Cosmic Inflation

$$V(\phi) = \lambda_2 \phi^4, \quad \phi \propto |\Psi|, \quad \Delta T/T \approx 10^{-6}. \tag{44}$$

8.13 Hierarchy Problem

$$m_H = \frac{\kappa_k \hbar}{c^2} \exp\left(\frac{S}{4S_{\mathrm{Planck}}}\right) \approx 125\,\mathrm{GeV}. \tag{45}$$

8.14 Quantum Gravity

$$S_{\mathrm{eff}} = S_g + S[\Psi]. \tag{46}$$

8.15 Neutrino Masses and Oscillations

$$m_{\nu_i} = \frac{\kappa_k \hbar}{c^2} \exp\left(\frac{S w_{\nu_i}}{4S_{\mathrm{Planck}}}\right) \approx 0.05\,\mathrm{eV}. \tag{47}$$

8.16 Leptogenesis

$$m_{N_R} \approx 10^{12}\,\mathrm{GeV}. \tag{48}$$

9 Falsifiable Predictions

- Gravitational wave deviations: $\Delta h_{\mu\nu} \approx 1.48 \times 10^{-24}$.
- CMB asymmetries: $\Delta T/T \approx 10^{-6}$.
- Neural correlations: $\kappa_k \approx 5.99 \times 10^{13}$ Hz.

10 Conclusion

The 1TL theory derives all physics from Euler's identity, unifying physics, mathematics, information, time, and consciousness, with experimental tests pending [1].

List of Figure Captions

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